



COMMUNITY PERCEPTION OF THE POTENTIAL ENVIRONMENTAL SERVICES AT ECO-EDUTOURISM TAPAK MANGROVE, SEMARANG CITY

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Abstract

Mangroves are a type of dicotyledonous plant that is easily found in coastal estuary areas with swampy or dense structures, with various benefits in ecological, biological, and economic aspects. Edu-Ecotourism Tapak Mangrove is one of the mangrove tourist areas in the city of Semarang. The purpose of this research was to determine the potential of Edu-Ecotourism Tapak Mangrove environmental services with community perceptions, including provision services, regulatory services, cultural services, and supporting services. Primary data collection methods are observation, questionnaires, and interviews. Secondary data includes journal literature, books, and related regulations. The analysis was carried out using a qualitative-descriptive approach. Results showed that the characteristics of the respondents were dominated by residents of Semarang City with an age range of >35 years, and an income above Rp.3,000,000. Eco-Edutourism Tapak Mangrove provides four types of environmental services, including provision services, regulatory services, cultural services, and supporting services. The potential for the provision of services is obtained from 11 types of mangrove plants at the location, along with the carbon absorption received. Potential regulatory services have an average respondent result of 91%. Potential regulatory services include the benefits of mangroves to withstand the onslaught of sea waves, maintain water quality, protect ponds from erosion, withstand strong winds, provide air purification, provide a sense of comfort to visitors, and prevent climate change. Cultural services include benefits for recreation (natural tourism and education), pond cultivation, work, and research. The potential for supporting services has an average respondent result of 98.7%. The potential supporting services in this park include the benefits of producing oxygen, improving the fertility of the mangrove ecosystem, and providing a habitat for flora and fauna.

Keywords: Eco-Edutourism, Environmental Services, Mangrove, Perception, Tapak Mangrove

INTRODUCTION

Mangroves are a type of plant that can be found in coastal estuary areas with swampy or dense soil structures. Mangrove forests in ecosystems have a very important ecological function, namely as a supporting capacity for the stability of coastal ecosystems (Karminarsih, 2007). Mangrove plants are a type of dicotyledonous plant that can live in brackish water and sea water (Apriliyani et al., 2020). Mangroves are one solution to environmental problems in overcoming environmental damage caused by sea air waves. The damage has an impact on coastal erosion and potential risks include air in residential areas. Mangroves in Indonesia can be said to be critical because there is damage of around 68% or 5.9 million hectares with a total area of 8.6 million hectares (Majid et al., 2016). Mangrove plants have the characteristics of living in groups with large

populations, relatively large roots, and having fruit (Gunawan et al., 2022). Mangroves are beneficial for the sustainability of the beach, apart from that the beach area also becomes beautiful with the landscape arrangement.

Mangroves have various broad benefits when viewed from ecological, biological, and economic perspectives. The ecological function of mangroves is to maintain the stability of beaches and bird habitat, their biological function as a nursery for fish and other marine biota, as well as their economic function, namely as a means of recreation, pond fish cultivation, and wood utilization (Nanlohy and Masniar, 2020). Coastal communities are important in managing mangrove ecosystems. The community conditions that need to be known are primarily the social structure, forms of use, and intensity of interaction in coastal areas by the community (Diah et al., 2015). Coastal communities can preserve mangrove forests by maintaining the mangrove ecosystem. The bottom-up approach can be a means of maintenance, namely through mangrove forest rehabilitation. Restoration of mangrove forests can come from government costs, while planning, implementation, evaluation of success, and sustainable use can be entrusted to the community (Lugina et al., 2017).

Ecotourism is a natural tourism activity that is responsible for maintaining ecological quality and improving the welfare of local communities. Ecotourism basically focuses on aspects of tourism, living creatures, and the environment (Arief & Sunarminto, 2020). The definition of community-based ecotourism can be interpreted as community involvement in the development, management, and planning of tourism (Asy'ari et al., 2021). Community-based ecotourism is a participatory tourism development planning approach that describes a form of tourism with important impacts on the environment, socio-culture, and economy that is also beneficial to local communities (Keliwar et al., 2013). The role of stakeholders is needed for the use of mangrove ecotourism so that there is a management plan to ensure sustainability (Joandani et al., 2019). High levels of human involvement and adaptation patterns can produce differences in density in mangrove vegetation (Susi et al., 2018). Differences in density can affect the level of survival of mangroves because each type has a different level of survival (Yulianda & Fahrudin, 2017). Support from nature is really needed to produce interesting natural tourism activities, such as good environmental conditions, biodiversity that is diverse and not dangerous for visitors, and various types of mangroves, so that they can also be used as educational tourism (Zulia et al., 2019).

Environmental services are the benefits of ecosystems and the environment for humans and the continuity of life, which include providing natural resources, regulating nature and the environment, supporting natural processes, and preserving cultural values (Government Regulation Number 46 of 2017). Environmental services are a product that can or cannot be measured directly from an ecological system (ecosystem) in the form of providing natural resources, protecting the hydrological system, improving soil fertility, and controlling erosion and flooding (Juniah et al., 2012). Environmental services can be grouped into four, namely: (1) Provisioning services, products originating from ecosystems, such as food, water, fuel, fiber, etc., (2) Regulating services, benefits obtained from regulatory ecosystem processes, such as maintaining air quality, climate regulation, water management, flood control, human disease regulation,



etc., (3) Cultural services, non-material benefits obtained from ecosystems, such as cultural diversity, spiritual and religious values, educational value, inspiration, aesthetic value, social relations, heritage, recreation, etc., and (4) Supporting services, services needed to produce other ecosystem services, such as soil formation, habitat availability, nutrient cycles, primary production, etc. (Millennium Ecosystem Assessment, 2005). Environmental services are products of biological natural resources and their ecosystems in the form of tangible benefits and/or intangible benefits (Desiana et al., 2019).

Tapak Mangrove is located in Tugu District, Semarang City, in the northern coastal region of Central Java. The existence of mangroves in this area has been utilized by the community for eco-education, mangrove tourism, and coastal environmental conservation activities. The coastal area in Tugurejo Village is one of the coastal areas of the city of Semarang where the condition of the mangroves was damaged due to abrasion amounting to 1,211.20 ha and experienced a coastline retreat of up to 1.7 kilometers, precisely in the Tapak area (Yaqin et al., 2022). Tapak mangroves have immense potential and benefits for the Tapak community, including ecological, physical, social, and economic benefits, as well as tourism benefits (Fitriyani, 2015). The purpose of this research is to analyze the potential environmental services from Eco-Edutourism Tapak Mangrove by the community including provision services, regulatory services, cultural services, and supporting services.

METHODS

This research was conducted at the Eco-Edutourism Tapak Mangrove location in Tugurejo Village, Tugu District, Semarang City. Astronomically, this research is located at 6°96 '22.6" south latitude and 110°34 '82.3" east longitude. The research was conducted in October 2023. Primary data was collected using observation, questionnaires, and interviews. This primary data includes data on the general characteristics of respondents as well as data related to the potential for regulatory services and the potential for supporting services for Eco-Edutourism in Mangrove Tapak. The number of questionnaire respondents in this study was 55, who were identified using random sampling techniques. Random sampling is a method of determining research samples that is based on the principle of chance, namely someone who happens to meet the researcher and is suitable as a data source (Meidatuzzahra, 2019). Respondents to this questionnaire are visitors, managers, and workers in the Tapak Mangrove Eco-Edutourism area. Secondary data related to the provision of environmental services and cultural environmental services at Eco-Edutourism Tapak Mangrove was carried out through literature studies. The data that has been obtained is then analyzed using qualitative descriptive methods to explain the potential of the environmental services provided by Eco-Edutourism Tapak Mangrove. Qualitative Description (QD) is a research method based on a simple qualitative inductive flow approach (Yuliani, 2018).

RESULTS AND DISCUSSION

1. Condition of The Eco-Edutourism Tapak Mangrove

Table 1. Mangrove Area in the Tugurejo Village and Semarang City Areas

No	Region	Area (Ha)
1.	Semarang City	94,39
2.	Tugurejo Village	15,05

Source: Handayani et al. (2016)

Based on Table 1, Tugurejo Village, which is the location of Tapak Mangrove Eco-Edutourism, has a mangrove area of 15.05 ha or 15.94% of the total mangrove area in Semarang City. The condition of mangroves in Tapak Village, Tugurejo Subdistrict, Semarang City is currently quite good compared to other surrounding areas. However, this condition does not necessarily mean that the mangroves in the village are safe from various pressures of damage due to community activities, especially the people living around the mangroves to fulfill their daily needs. The area of mangroves in several coastal areas of the city of Semarang, including in the Tugu area, is still quite large compared to mangroves in other areas around the coast (Mirza et al., 2022). In the Tapak Mangrove area, various parties have often carried out mangrove planting activities for rehabilitation. Multi-stakeholder involvement in coastal area rehabilitation efforts in Semarang City shows a penta-helix partnership model, including elements of academia, business, government, the community, and NGOs.

Eco-Edutourism Tapak Mangrove has several community groups that contribute to its management and development, including the Perkumpulan Pemuda Cinta Alam Tapak or Prenjak, the Tambak Farmers Group (Sido Rukun), the Tapak Coastal Women's Group "Putri Tirang", and Pokdarwis Bina Tapak Lestari (Martuti et al., 2018). Based on the results of observations, there are various facilities to support various activities inside. These facilities include: 26 large boats (17 active for tourism), 6 small boats, posters and tourist education boards, gazebos, mangrove tracking, and bridges. Activities carried out in the Tapak Mangrove area include nature tourism, educational tourism, MSMEs, and management of pond products (shrimp, milkfish, tilapia, crab, seaweed, etc).

2. Respondent Characteristics

The respondents who were used as research subjects or samples were visitors who visited Eco-Edutourism Tapak Mangrove. Data obtained from 55 respondents who filled out a questionnaire with several lists of questions showed that the characteristics of the respondents were classified into several aspects including: gender, age, highest level of education, occupation, monthly income, and the purpose of the respondents' visit to Eco-Edutourism Tapak Mangrove. The classification related to aspects of the characteristics of respondents as objects studied is explained in **Table 2**.

Table 2. Characteristics of Respondents in Eco-Edutourism Tapak Mangrove

No	Characteristics of Respondents	Percentage (%)
1.	Address/Area of Origin:	
	a. Semarang	96%

	b. Outside Semarang	4%
2.	Gender	
	a. Male	76%
	b. Female	24%
3.	Age	
	a. <18	13%
	b. 18-25	20%
	c. 25-35	25%
	d. >35	42%
4.	Last Education	
	a. Elementary School	15%
	b. Junior High School	18%
	c. Senior High School	45%
	d. College	22%
5.	Jobs	
	a. Student	16%
	b. Private Employees	33%
	c. Civil Servants	3,5%
	d. Fisherman	20%
	e. Seller	3,5%
	f. Housewife	15%
	g. Other	9%
6.	Income	
	a. Not Work	31%
	b. <Rp.1.000.000	9%
	c. Rp.1.000.000-Rp.3.000.000	25%
	d. >Rp.3.000.000	35%
7.	Purpose of Visit	
	a. Recreation	67%
	b. Other	33%

Source: Author (2023)

The data results in Table 2 show that the highest percentage of visitors coming from Semarang City is 96% and the percentage of visitors coming from outside Semarang City is 4%. Based on these results, it shows that local visitors from Semarang City dominate more because they already know information about the location of this park than visitors from outside Semarang. The factors of easier and closer access and distance to reach the people of Semarang City also have an influence. The existence of mangrove tracking also has an influence on local people to enjoy tourism in the afternoon while exercising or just looking at the view. Visitors are dominated by males at as much as 76% and females at as much as 24%. Based on observations that have been made, the dominance of male visitors is due to the fact that most of them have the main goal of knowing about mangroves, fishing, and managing ponds. Meanwhile, female visitors enjoy more the natural beauty with various kinds of plants and the atmosphere of tourist locations.

Furthermore, if viewed from the age aspect, visitors are dominated by the age range <18 years with a percentage of 13%, the age range 18–25 years with

20%, the age range 25–35 years with a percentage of 25%, and the age range >35 years with 42%. It was found that the dominant number of visitors was >35 years old, but if the total number of visitors was totaled, the majority of visitors were under 35 years old. Visitor income is dominated by above IDR 3,000,000 by 35%. Based on the research results of Hidayat (2011), it shows that the higher the average income per month of visitors, the frequency of visits to tourist attractions will increase, conversely, if the average income per month of visitors is low, the frequency of visits will decrease in accordance with demand theory. The purpose of the respondents in visiting Eco-Edutourism Tapak Mangrove was an aspect of the criteria studied, where 67% of respondents stated that the purpose of their visit was for recreation. This is because when interacting with nature, various environmental services will be felt and provide positive energy for those who visit for recreational purposes. Meanwhile, the other 33% of respondents aim to research or work in the Tapak Mangrove area as fishermen, pond managers, and edu-ecotourism managers.

3. Potential of Environmental Services Eco-Edutourism Tapak Mangrove

Potential of Provision Services

Provision services, namely environmental services that can actually be enjoyed and have direct (tangible) reciprocal benefits. This is because the various environmental services provided are relatively consumptive in nature, for example coming from trees, plants and water (Zulpikar et al., 2017). The main provision of services provided by Eco-Edutourism Mangrove Tapak comes from existing mangrove plants. The following is an inventory of mangrove types at Eco-Edutourism Mangrove Tapak.

Table 3. Inventory of Mangrove Types in Tapak Mangrove Eco-Edutourism

No	Species	Mangrove Type	Origin Name
1.	<i>Avicennia alba</i>	True Mangrove	Brayu, Api-api
2.	<i>Avicennia marina</i>	True Mangrove	Brayu, Api-api
3.	<i>Bruguiera cylindrical</i>	True Mangrove	Tancang, Burus
4.	<i>Bruguiera gymnorrhiza</i>	True Mangrove	Tancang, Burus
5.	<i>Ceriops decandra</i>	True Mangrove	Tengar, lindur
6.	<i>Excoecaria agallocha</i>	True Mangrove	Buta-but
7.	<i>Rhizophora apiculata</i>	True Mangrove	Bakau merah
8.	<i>Rhizophora mucronata</i>	True Mangrove	Bakau besar, bakau hitam
9.	<i>Rhizophora stylosa</i>	True Mangrove	Bakau putih
10.	<i>Sonneratia casseolaris</i>	True Mangrove	Pidada, bogem
11.	<i>Xylocarpus mollucensis</i>	True Mangrove	Nyirih

Source: Martuti (2013)

Based on **Table 3**, there are 11 types of mangrove plants in Tapak Village with an inventory including *Avicennia alba*, *Avicennia marina*, *Bruguiera cylindrical*, *Bruguiera gymnorrhiza*, *Ceriops decandra*, *Excoecaria agallocha*, *Rhizophora apiculata*, *Rhizophora mucronata*, *Rhizophora stylosa*, *Sonneratia casseolaris*, and *Xylocarpus mollucensis*. The dominant mangrove species in Tapak Mangrove are *Rhizophora mucronata* and *Avicennia marina* (Yaqin et al., 2022). All types of mangrove plants found in Tapak Village are true mangroves. True mangroves are a group of plants that morphologically, anatomically, and physiologically have adapted to living in areas around the coast (Martha, 2017). True mangroves grow on sandy, rocky, and especially muddy substrates. True

mangroves are a type of plant that lives in tidal areas, is able to absorb salt, and at the same time has an adaptation system to remove excess salt that is not needed through its stems and leaves (Sunandar et al., 2018).

Potential of Regulatory Services

Table 4. Respondent's Answers to Potential Regulatory Services in Eco-Edutourism Tapak Mangrove

No	Indicator	Answer	
		Yes	No
1.	Judging from the type of plants, are Eco-Edutourism Tapak Mangroves able to withstand the onslaught of sea waves?	82%	18%
2.	Judging from the condition of the water around the existing mangroves, are the Eco-Edutourism Tapak Mangroves able to maintain water quality?	100%	0%
3.	Judging from the physical condition of the plants, are Eco-Edutourism Tapak Mangroves able to protect ponds from erosion?	85%	15%
4.	Based on the physical condition of the plants, are Eco-Edutourism Tapak Mangroves able to withstand strong winds?	93%	7%
5.	Based on the number of plants, are Eco-Edutourism Tapak Mangroves effective as an air purifier?	89%	11%
6.	Do Eco-Edutourism Tapak Mangroves have a function to support the environment by providing a sense of comfort (cool and shade) to visitors?	96%	4%
7.	Judging from the plants, are Eco-Edutourism Tapak Mangroves able to withstand climate change?	93%	7%
Average		91%	9%

Source: Author (2023)

Based on **Table 4**, the results showed that an average of 91% of respondents agreed that there was potential for regulatory services in the Tapak Mangrove. Regulatory services are the function of an environment in managing existing resources to maintain sustainability within it (Widyaningtyas et al., 2023). The first question in Table 4, regarding the ability of Tapak Mangroves to withstand the onslaught of sea waves, received a respondent result of 82%. According to Ermiliansa et al. (2013), the condition of mangrove forests in Semarang City has long experienced widespread degradation due to abrasion and land change. This is in line with the condition of mangrove forests, which continue to experience degradation due to withstanding the onslaught of sea water. However, there is still a lot of damage, so mangrove conservation must be maintained. The second question in Table 4, namely the ability of mangroves to maintain water quality, obtained 100% of respondents agreeing. Clark et al. (1998) in Kumar et al. (2011), the mangrove ecosystem plays an important role as a filter and natural pollution control because of the unique root system, which successfully controls water quality and is a trap for sediment and particles transported by currents to the ocean

from the estuary. It can be said that mangroves have a very vital function for water quality, especially in coastal areas.

The third question was about the ability of Tapak Mangrove plants to protect ponds from potential erosion. 85% of respondents agreed. The fourth question in Table 4, related to the ability of Tapak Mangrove plants to withstand wind, was approved by 93% of respondents. The physical functions of mangrove forests include: maintaining the stability of coastlines and river cliffs from erosion or abrasion; accelerating land expansion by absorbing mud deposits carried by currents into mangrove forest areas; controlling the rate of sea water intrusion so that the surrounding well water becomes fresher; and protecting the area behind the mangrove from crashing waves, strong winds, and tsunami danger (Setiawan, 2013). In this way, Tapak Mangrove forest can serve as a buffer against erosion and a barrier against strong winds.

In the fifth question in Table 4, 89% of respondents agreed that the mangroves in Tapak Mangrove were effective as an air purifier. In the sixth question in Table 4, respondents agreed 96% that Tapak Mangroves can support the environment by providing a sense of comfort in the form of coolness and shade to visitors. In the seventh question in Table 4, 93% of respondents agreed that Tapak Mangroves could help withstand climate change. Mangroves can absorb excess CO² content in the air and absorb dangerous heavy metals (mercury (Hg), lead (Pb), etc.) contained in sediments, as well as filter pollutants, regulate microclimate, and act as carbon stocks (Irawanto, 2020). In accordance with the following statement, Tapak Mangroves can help clean the air by absorbing excess CO² content in the air, providing a cool feeling by controlling the microclimate, and preventing climate change.

Potential of Cultural Services

Cultural services are environmental services with benefits obtained in intangible or non-material form. Cultural services can include identity characteristics, cultural diversity, religious values, aesthetics, social relations, recreation, and various other values. The potential for cultural services contained in Eco-Edutourism Tapak Mangrove is recreation, including nature tourism and educational tourism. This is shown by 67% of respondents having the aim of visiting for recreation. Recreation is an activity carried out by a person or collectively with other people during free time, consciously or voluntarily, to directly and immediately obtain joy, satisfaction, and personal freshness (Alfina, 2013). Another 33% of respondents visited to carry out pond cultivation and research activities.

Potential of Supporting Services

Table 4. Respondent's Answers to Potential Supporting Services in Eco-Edutourism Tapak Mangrove

No	Indicator	Answer	
		Yes	No
1.	Does the Eco-Edutourism Tapak Mangrove function as a place that produces a lot of oxygen?	96%	4%
2.	Judging from the development of the plants, do the plants in the mangroves of Eco-Edutourism Tapak Mangrove appear to be growing well?	100%	0%

3. Based on physical conditions, do Eco-Edutourism Tapak Mangroves contain many animals, such as birds, fish, shrimp, crabs, etc?	100%	0%
Average	98,7%	1,3%

Source: Author (2023)

Based on Table 5, the results showed that an average of 98.7% of respondents agreed that there was potential for supporting services in the Tapak Mangrove. Supporting services are intangible benefits provided by the environment to humans which include all services related to ecological processes in the ecosystem (Sjafrie, 2016). The first question in table 5, respondents agreed 96% that the mangroves in Tapak are a place that produces a lot of oxygen. Mangroves are able to produce greater amounts of oxygen than land plants and are able to control abrasion and the entry of sea water (intrusion) into land areas, and are able to retain waste originating from land which is controlled through their root system (Tumangger and Fitriani, 2019).

In the sixth and seventh questions in table 5, 100% of respondents agreed that the mangroves in Tapak looked fertile and there were many animals such as birds, fish, shrimp, crabs. The fertility of the Tapak Mangrove ecosystem at the research site is classified as good due to the abundance of nutrients (nitrate and phosphate) and chlorophyll-a as well as the abundance of plankton in the waters (Prihatin et al., 2018). Distribution of chlorophyll-a, nutrients (phosphate & nitrate) and plankton which are useful as indicators of the fertility of the Tapak Tugurejo Semarang Mangrove aquatic ecosystem. Animals are also found in the Eco-Edutourism Tapak Mangrove area, both cultivated by the community and present naturally without human intervention. Cultivation carried out by the community in the Tapak Mangroves is dominated by cultivating milkfish, tilapia, crabs, seaweed and shrimp.

CONCLUSION

Mangrove Characteristics Tapak has a mangrove area of 15.05 ha or 15.94% of the total mangrove area in Semarang City. The characteristics of visitors to Eco-Edutourism Tapak Mangrove are dominated by residents of Semarang City, male, with an age range of >35 years and an income above IDR 3,000,000. Eco-Edutourism provides four environmental services, including provision services, regulatory services, cultural services, and supporting services. The potential for providing services is obtained from 11 types of mangrove plants at the location. Potential regulatory services include the benefits of mangroves to withstand the onslaught of sea waves, maintain water quality, protect ponds from erosion, withstand strong winds, provide air purification, provide a sense of comfort to visitors, and prevent climate change. Cultural services include benefits for recreation (natural tourism and education), pond cultivation, work, and research. The potential supporting services in this park include the benefits of producing oxygen, improving the fertility of the mangrove ecosystem, and providing a habitat for flora and fauna.

SUGGESTION

1. Eco-Edutourism Mangrove Sites are preserved by multi-stakeholders, so that every existing environmental service can provide benefits to the community and

existing marine biota.

2. It is hoped that there will be information related to mangrove plants found at Eco-Edutourism Tapak Mangrove which can be displayed on posters/information boards.

3. Garbage disposal facilities can be added along the mangrove tracking and it is necessary to add permanent toilets at the Eco-Edutourism Tapak Mangrove, so that they can complete visitor maintenance facilities.

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REFERENCE

- Alfina, I. (2013). *Manajemen Pengelolaan Fasilitas Outbound Objek Wisata Linggo Asri Sebagai Wahana Pendidikan Rekreasi Di Kabupaten Pekalongan Tahun 2013* (Doctoral Dissertation, Universitas Negeri Semarang).
- Apriliyani, Y., Safe'i, R., Kaskoyo, H., Wulandari, C., & Febryano, I. G. (2020). Analisis Penilaian Kesehatan Hutan Mangrove di Kabupaten Lampung Timur. *Jurnal Hutan Tropis*, 8(2), 123-130.
- Arief, H., & Sunarminto, T. (2020). *Pengembangan Ekowisata Hutan Adat di Ammatoa Kajang Sulawesi Selatan* (Doctoral dissertation, IPB University).
- Asy'ari, R., Dienaputra, R. D., Nugraha, A., Tahir, R., Rakhman, C. U., & Putra, R. R. (2021). Kajian Konsep Ekowisata Berbasis Masyarakat dalam Menunjang Pengembangan Pariwisata: Sebuah Studi Literatur. *Pariwisata Budaya: Jurnal Ilmiah Agama Dan Budaya*, 6(1), 9-19.
- Desiana, Roslinda, E., & Kartikawati, SM (2019). Jasa Lingkungan Taman Keanekaragaman Hayati (KEHATI) Badan Lingkungan Hidup di Kabupaten Sekadau Tahun 2017. *Jurnal hutan lestari*, 7 (1), 442-452.
- Diah, K. B., Anak, A. S. A. W., Sri, W., & Indah, N. (2015). Konservasi Hutan Mangrove untuk Meningkatkan Perekonomian Masyarakat Kawasan Pesisir di Pulau Mengare Kec. Bungah Kab. Gresik Propinsi Jawa Timur. *Prosiding Seminar Nasional "Research Month" 2015*, 311-319.
- Ermiliansa, D., Samekto, A., & Purnaweni, H. (2013). Pengembangan Kawasan Konservasi Dengan Konsep Eco Edu Wisata Mangrove di Dusun Tapak Kelurahan Tugurejo Kota Semarang. *In Proceeding Biology Education Conference: Biology, Science, Enviromental, and Learning*, 10(1): 1-8.
- Fitriyani. (2015). Peran Pemuda Dalam Mengembangkan Eco Edu Wisata Mangrove dan Implikasinya Terhadap Ketahanan Lingkungan Daerah (Studi pada Perkumpulan Pemuda Peduli Lingkungan "Prenjak" Dusun Tapak, Kelurahan Tugurejo, Kecamatan Tugu, Kota Semarang, Provinsi Jawa Tengah). *Jurnal Ketahanan Nasional*, 21(2), 128- 141.
- Government Regulation Number 46 Year 2017 about Environmental Economic Instruments.
- Gunawan, B., Purwanti, S., Hidayati, S., Pratiwi, Y. I., Ali, M., & Nisak, F. (2022). Aksi Restorasi Penanaman Mangrove Dalam Memitigasi Bencana. *Asthadarma: Jurnal Pengabdian Kepada Masyarakat*, 3(2), 1-10.



- Handayani, O. T., Ngabekti, S., & Martuti, N. K. T. (2016). Keanekaragaman Crustacea di Ekosistem Mangrove Wilayah Tapak Kelurahan Tugurejo Kota Semarang. *Life Science*, 5(2), 100-107.
- Hidayat, M. (2011). Strategi Perencanaan dan Pengembangan Objek Wisata (Studi Kasus Pantai Pangandaran Kabupaten Ciamis Jawa Barat). *THE Journal: Tourism and Hospitality Essentials Journal*, 1(1), 33-44.
- Irawanto, R. (2020). Keanekaragaman Vegetasi Mangrove di Pesisir Kota Surabaya dan Potensinya sebagai Fitoremediator Lingkungan. In *Prosiding Seminar Nasional Biologi*, 6(1): 413-422.
- Irsadi, A., Martuti, N. K. T. & Nugraha, S. B. (2017). Estimasi Stok Karbon Mangrove Di Dukuh Tapak Kelurahan Tugurejo Kota Semarang. *Saintekno: Jurnal Sains dan Teknologi*, 15(2): 119-128.
- Joandani, G. K., Pribadi, R. & Suryono, C. A. (2019). Kajian Potensi Pengembangan Ekowisata sebagai Upaya Konservasi Mangrove di Desa Pasar Banggi, Kabupaten Rembang. *Journal of Marine Research*, 8(1), 117-126.
- Juniah, R., Dalimi, R., Suparmoko, M., & Moersidik, S. S. (2012). Dampak Pertambangan Batubara terhadap Kesehatan Masyarakat Sekitar Pertambangan Batubara (Kajian Jasa Lingkungan Sebagai Penyerap Karbon). *Indonesian Journal of Health Ecology*, 12(1), 252-258.
- Karminarsih, E. (2007). Pemanfaatan Ekosistem Mangrove bagi Minimasi Dampak Bencana di Wilayah Pesisir. *Jurnal Manajemen Hutan Tropika*, 13(3), 182-187.
- Keliwar, S., Kajian, M., Sekolah, P., Universitas, P., & Mada, G. (2013). Pola Pengelolaan Ekowisata Berbasis Komunitas Di Taman Nasional Gunung Halimun Salak. *Jurnal Nasional Pariwisata*, 5(2), 110-125. <https://doi.org/10.22146/jnp.6371>
- Kumar, N. J. I., Sajish, P. R., Kumar, R. N., George, B., & Viyol, S. (2011). Bioaccumulation of Lead, Zinc and Cadmium in *Avicennia marina* Mangrove Ecosystem near Narmada Estuary in Vamleshwar, West Coast of Gujarat, India. *J. Int. Environmental Application & Science*, 6(1): 008-013.
- Lugina, M., Alviya, A., Indartik, & Pribadi, M. A. (2017). Strategi Keberlanjutan Pengelolaan Hutan Mangrove di Tahura Ngurah Rai Bali. *Jurnal Analisis Kebijakan Kehutanan*, 14(1), 61-77.
- Majid, I., Mimien, H. I., Fachur, R., & Istamar, S. (2016). Konservasi Hutan Mangrove di Pesisir Pantai Kota Ternate Terintegrasi dengan Kurikulum Sekolah. *Jurnal BIOEDUKASI*, 488-496.
- Martha, I. N. (2017). *Inventarisas Mangrove Di Kampung Nipah Kecamatan Perbaungan Kabupaten Serdang Bedagai Sumatera Utara*. Universitas Medan Area.
- Martuti, N. K. T. (2013). Keanekaragaman Mangrove di Wilayah Tapak, Tugurejo, Semarang. *Indonesian Journal of Mathematics and Natural Sciences*, 36(2), 123-130. <https://doi.org/10.15294/ijmns.v36i2.2971>
- Martuti, N. K. T., Susilowati, S. M. E., Sidiq, W. A. B. N., & Mutiatari, D. P. (2018). Peran Kelompok Masyarakat dalam Rehabilitasi Ekosistem Mangrove di Pesisir Kota Semarang. *Jurnal Wilayah dan Lingkungan*, 6(2), 100-114.
- Meidatuzzahra, D. (2019). Penerapan Accidental Sampling untuk Mengetahui

- Prevalensi Akseptor Kontrasepsi Suntikan terhadap Siklus Menstruasi (Studi kasus: Pukesmas Jembatan Kembar Kabupaten Lombok Barat). *AVESINA: Media Informasi Ilmiah Universitas Islam Al-Azhar*, 13(1), 19-23.
- Millenium Ecosystem Assessment. (2005). *Ecosystems and Human Well-being*. Washington: Island press.
- Mirza, M., Anggoro, S., & Muhammad, F. (2022). Strategi Pengembangan Ekowisata Mangrove Pesisir Tapak Kelurahan Tugurejo, Semarang, Jawa Tengah. *Jurnal Ilmu Lingkungan*, 20(4), 806-815.
- Nanlohy, L. H., & Masniar, M. (2020). Manfaat Ekosistem Mangrove Dalam Meningkatkan Kualitas Lingkungan Masyarakat Pesisir. *Abdimas: Papua Journal of Community Service*, 2(1), 1-4.
- Prihatin, P., Prabang, S., & Sunarto. (2018). Sebaran Klorofil-a, Nitrat, Fosfat, dan Plankton sebagai Indikator Kesuburan Ekosistem di Mangrove Tapak Tugurejo Semarang. *Jurnal Ilmu Lingkungan*, 16(1), 68-77.
- Roslinda, E., & Kartikawati, SM (2019). Jasa Lingkungan Taman Keanekaragaman Hayati (KEHATI) Badan Lingkungan Hidup di Kabupaten Sekadau Tahun 2017. *Jurnal hutan lestari*, 7(1), 442-452.
- Setiawan, H. (2013). Status Ekologi Hutan Mangrove pada Berbagai Tingkat Ketebalan. *Jurnal Penelitian Kehutanan Wallacea*, 2(2), 104-120.
- Sjafrie, N. D. M. (2016). Jasa Ekosistem Pesisir. *Oseana*, 41(4), 25-40.
- Sunandar, A. P., Dian, S., Mutiara, P. A., Saraswati, F. R., & Rio, C. H. (2018). Struktur Komunitas dan Persebaran Mangrove Sejati di Gisik Pantai Pasirmendit, Yogyakarta. In *Prosiding Seminar Nasional*, 1-8.
- Susi, S., Adi, W., & Sari, S. (2018). Potensi Kesesuaian Mangrove Sebagai Daerah Ekowista Di Dusun Tanjung Tedung Sungai Selan Bangka Tengah. *Akuatik: Jurnal Sumberdaya Perairan*, 12(1), 65-73.
- Tumanger, B. S. (2019). Identifikasi dan Karakteristik Jenis Akar Mangrove Berdasarkan Kondisi Tanah dan Salinitas Air Laut di Kuala Langsa. *Biologica Samudra*, 1(1), 09-16.
- Widyaningtyas, R., Safitri, R. N., & Kisworo, W. (2023). Analisis Jasa Lingkungan Taman Pakujoyo, Kabupaten Sukoharjo, Jawa Tengah. *Nusantara Hasana Journal*, 2(12), 115-126.
- Yaqin, N., Rizkiyah, M., Putra, E. A., Suryanti, S., & Febrianto, S. (2022). Estimasi Serapan Karbon pada Kawasan Mangrove Tapak di Desa Tugurejo Semarang. *Buletin Oseanografi Marina*, 11(1), 19-29.
- Yulianda, F., & Fahrudin, A. (2017). *Pengembangan Ekowisata Berbasis Masyarakat Di Kawasan Pesisir Desa Bahoi, Kabupaten Minahasa Utara, Provinsi Sulawesi Utara* (Doctoral dissertation, Bogor Agricultural University (IPB)).
- Yuliani, W. (2018). Metode Penelitian Deskriptif Kualitatif dalam Perspektif Bimbingan dan Konseling. *Quanta*, 2(2), 83-91.
- Zulia, M., Supratman, O., & Sari, S. P. (2019). Kesesuaian Dan Daya Dukung Ekowisata Mangrove di Desa Kurau dan Desa Kurau Barat Kabupaten Bangka Tengah. *Akuatik: Jurnal Sumberdaya Perairan*, 13(2), 94-104.
- Zulpikar, F., Prasetyo, D. E., Shelvatis, T. V., Komara, K. K., & Pramudawardhani, M. (2017). Valuasi Ekonomi Objek Wisata Berbasis Jasa Lingkungan Menggunakan Metode Biaya Perjalanan di Pantai Batu Karas Kabupaten Pangandaran. *Journal of Regional and Rural Development*



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